

WHAT IS CLAIMED IS:

1. A wavelength locking package comprising: a stacked dielectric filter having a repeating transmission profile that comprises a positive slope and a negative slope.

2. The wavelength locking package as recited in Claim 1, wherein said repeating transmission profile is a substantially sinusoidal function.

3. The wavelength locking package as recited in Claim 1, wherein said repeating transmission profile is a substantially triangular function.

4. The wavelength locking package as recited in Claim 1, wherein an absolute value of said slope changes by at least about 0.5% transmittance per GHz.

5. The wavelength locking package as recited in Claim 1, wherein said repeating transmission profile has spectral bands that are separated by about 25, about 50, about 100, or about 150 GHz.

6. The wavelength locking package as recited in Claim 1, wherein said stacked dielectric filter comprises alternating layers of a first and second dielectric material of different refractive index.

7. The wavelength locking package as recited in Claim 6, wherein said difference in refractive index between said first

and second dielectric material is at least about 0.6.

8. The wavelength locking package as recited in Claim 6, wherein said first and second dielectric material comprise Ta_2O_5 and SiO_2 , respectively.

9. The wavelength locking package as recited in Claim 1, wherein said transmission profile varies by less than about 0.3 picometers per °C.

10. The wavelength locking package as recited in Claim 1, further including a laser capable of emitting coherent light at a plurality of wavelengths.

11. A method of fabricating a wavelength locking package, comprising: providing a base; locating a stacked dielectric filter on said base, said stacked dielectric filter having a repeating transmission profile that comprises a positive slope and a negative slope; and locating a photodetector on said base material such that said photodetector is optically coupled to said stacked dielectric filter.

12. The method as recited in Claim 11, further including locating a laser on said base such that a portion of said laser's output is optically coupled to said stacked dielectric filter.

13. The method as recited in Claim 12, further including locating a collimating lens on said base, wherein said collimating lens is situated between an optical path between said laser and said stacked dielectric filter.

14. The method as recited in Claim 11, further including locating a thermal controller on said base wherein said thermal controller is capable of receiving a sampling signal from said photodetector.

15. The method as recited in Claim 11, further including locating a thermal unit on said base wherein said thermal unit is capable of receiving a control signal from said thermal controller and thereby heat or cool said package.

16. The method as recited in Claim 11, further including locating a thermistor on said base wherein said thermistor is capable of sending a temperature reading to said thermal controller and said thermal controller is capable of using said temperature reading to thereby adjust said control signal.

17. An optoelectronic communication system comprising: a laser capable of emitting coherent light at a plurality of wavelengths; a wavelength locking package comprising: a stacked dielectric filter having a repeating transmission profile that comprises a positive slope and a negative slope, said stacked dielectric filter capable of providing a signal to cause said laser to emit said coherent light at one of said pluralities of wavelengths; and an optical modulator coupled to said laser, said optical modulator capable of encoding information into said coherent light.

18. The optoelectronic communication system recited in Claim 17, further comprising an optical multiplexer coupled to

said optical modulator.

19. The optoelectronic communication system recited in Claim 17, further comprising a fiber optic network coupled to said optical multiplexer.

20. The optoelectronic communication system recited in Claim 17, further comprising a switching station coupled to said fiber optic network.